



PA-4C-E 1-Port High-Performance ESCON Channel Port Adapter Installation and Configuration

Product Number: PA-4C-E(=)

Platforms Supported: Cisco 7200 Series Routers, including the Cisco 7200 VXR Routers

Document part number: OL-3473-02



Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

- [Document Revision History, page 2](#)
- [Objectives, page 2](#)
- [Organization, page 2](#)
- [Related Documentation, page 3](#)
- [Obtaining Documentation, Obtaining Support, and Security Guidelines, page 3](#)

Document Revision History

The Document Revision History table below, beginning with version OL-3473-03, records technical changes to this document.

Document Version	Date	Change Summary
OL-3473-02	April, 2007	Restructured to parallel other port adapter documentation.

Objectives

This document describes how to install and configure the 1-Port High-Performance Enterprise Systems Connection (ESCON) IBM Channel Port Adapter (PA-4C-E), hereafter referred to as the HP ESCON PA, which is supported on Cisco 7200 series routers, including the Cisco 7200 VXR routers.

Organization

This document contains the following four sections:

Title	Description
Overview	Describes the HP ESCON PA and its LED displays, cables, and receptacles.
Preparing for Installation	Describes safety considerations, tools required, and procedures you should perform before the actual installation.
Removing and Installing Port Adapters	Describes the procedures for installing and removing HP ESCON PA port adapters in the supported platforms.
Configuring the HP ESCON PA	Provides instructions for configuring the HP ESCON PA on the supported platforms.

Related Documentation

Your router, switch, or gateway and the Cisco IOS software running on it contain extensive features and functionality, which are documented in the following resources:

- Cisco IOS software:

For configuration information and support, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.



Note You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at <http://www.cisco.com>, <http://www-china.cisco.com>, or <http://www-europe.cisco.com>.

- Cisco 7200 series routers:
 - For an online directory to quickly access documents for Cisco 7200 series routers, refer to the *Cisco 7200 Series Routers Documentation Roadmap* at the following URL:
http://www.cisco.com/en/US/products/hw/routers/ps341/products_documentation_roadmap09186a00801c0915.html
 - For hardware installation and configuration information (including the Cisco 7206 or Cisco 7206VXR as a router shelf in a Cisco AS5800 Universal Access Server), refer to the online installation and configuration guide and quick start for your Cisco 7200 series router.
 - For port adapter hardware and memory configuration guidelines, refer to the *Cisco 7200 Series Port Adapter Hardware Configuration Guidelines*.
 - For information on network processing engines or network services engines, refer to the *Network Processing Engine and Network Services Engine Installation and Configuration* document.
- Cisco 7200 VXR routers:
 - For an online directory to quickly access documents for Cisco 7200 VXR routers, refer to the *Cisco 7200 Series Routers Documentation Roadmap* at the following URL:
http://www.cisco.com/en/US/products/hw/routers/ps341/products_documentation_roadmap09186a00801c0915.html
 - For hardware installation and maintenance information, refer to the *Cisco 7200 VXR Installation and Configuration Guide* or the *Cisco 7200 VXR Routers Quick Start Guide*.
- For international agency compliance, safety, and statutory information for WAN interfaces, refer to the following document. Use the documentation roadmap for the Cisco 7200 series routers to link to this document:
 - *Regulatory Compliance and Safety Information for the Cisco 7200 Series Routers*

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly What's New in Cisco Product Documentation, which also lists all new and revised technical documentation at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Overview

This section describes the HP ESCON PA, including channel attachment, the LED functions, the memory and cable requirements, and contains the following subsections:

- [Port Adapter Overview, page 5](#)
- [ESCON Specifications, page 7](#)
- [LEDs, page 7](#)
- [ESCON Cable, page 9](#)
- [Port Adapter Slot Locations on the Supported Platforms, page 9](#)
- [Identifying Interface Addresses, page 10](#)

Port Adapter Overview

The HP ESCON PA is a high-speed (100 bandwidth points) port adapter for Cisco 7200 series routers, including the Cisco 7200 VXR routers, that supports IP Datagram, TCP/IP Offload, TN3270 Server, TCP Assist, Cisco MultiPath Channel (CMPC), CMPC+, and Cisco SNA (CSNA) software applications.

The HP ESCON PA provides a single channel interface for Cisco 7200 series routers

A mainframe channel (referred to as a *channel*) is an intelligent processor that manages the protocol on the communications media and controls the data transfer to and from the main central processing unit (CPU) storage. Devices called input/output processors (IOPs) communicate between the host CPU and the channel. One IOP controls multiple channels. There is no relationship between the number of CPUs and the number of IOPs.

The channel relieves the mainframe CPU of direct communication with input/output (I/O) devices, which saves processing cycles and allows data processing and communications tasks to run concurrently. Channels use one or more channel paths as the links between mainframes and I/O devices. I/O devices are connected directly to control units, which provide the logical capabilities required to operate and control the I/O devices.

In some situations, this interface can eliminate the need for a separate front-end processor (FEP). The HP ESCON PA contains one ESCON I/O connector.

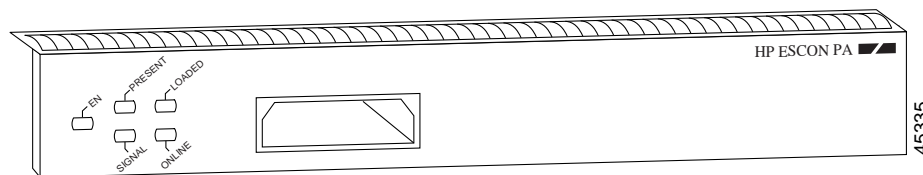
The HP ESCON PA ([Figure 1](#)) provides a single channel attachment interface for connecting Cisco 7200 series routers to an ESCON director or to a mainframe channel.



Note

The Cisco 7200 series routers support the OIR of all port adapter types.

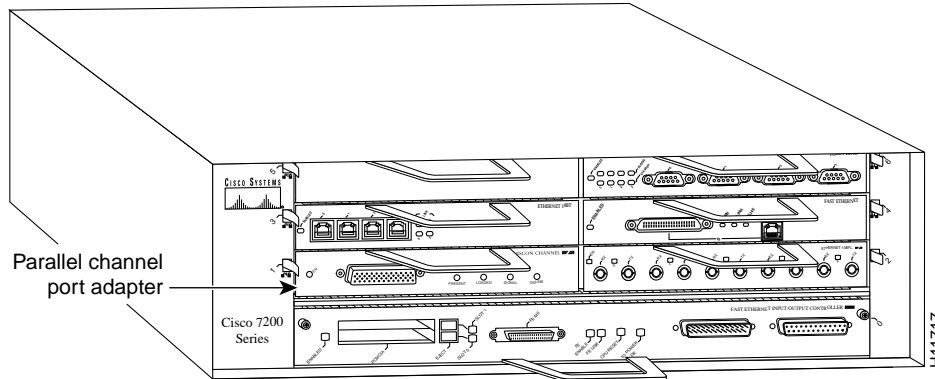
Figure 1 *ESCON Channel Port Adapter, Faceplate View*



The HP ESCON PA has a single female duplex connector and has 128 MB of DRAM. There are no memory options for the HP ESCON PA.

You can install the HP ESCON PA in any of the available port adapter slots in a Cisco 7200 series router. [Figure 2](#) shows an HP ESCON PA installed in port adapter slot 1 of a Cisco 7206.

Figure 2 Cisco 7206 with an HP ESCON PA in Port Adapter Slot 1



Note

The HP ESCON PA supports online insertion and removal (OIR), which allows you to install or remove an HP ESCON PA while the system is operating without shutting down system power.

The entire HP ESCON PA microcode image is delivered on a router Flash memory card or SanDisk memory device, or you can download it from Cisco.com.

- When ordered as a spare, the HP ESCON PA microcode is available via Cisco.com.
- When ordered as part of a new system, the HP ESCON PA microcode is available on Flash memory cards and SanDisk memory devices (which also include the Cisco IOS release compatible with the microcode version) and via Cisco.com.
- When shipped with a new system, there is a default setting in Cisco IOS that points to the HP ESCON PA microcode with which it has been virtually bundled (separately bundled and preloaded onto the Flash memory card or SanDisk memory device along with the compatible Cisco IOS software). The Cisco IOS software loads the HP ESCON PA microcode image onto the port adapter when the router boots and when an HP ESCON PA is inserted into a router that has already been booted.

We recommend that you use the version of the HP ESCON PA microcode that is virtually bundled with your Cisco IOS software. If you choose not to, you must copy a microcode image onto the router Flash memory card or SanDisk memory device and use the **microcode** router configuration command to instruct the Cisco IOS software to use the microcode image you copied instead of the microcode image virtually bundled with your version of the Cisco IOS software.

- For instructions on placing HP ESCON PA microcode on the router Flash memory card, see the [“Copying a New Image to the Flash Memory Card on a Cisco 7200 Series Router”](#) section on page 36.
- For instructions on placing HP ESCON PA microcode on the SanDisk memory device, see the [“Using SanDisk Devices”](#) section on page 38.
- For instructions on configuring Cisco IOS to use an HP ESCON PA image from the router Flash memory card or SanDisk memory device, refer to the [“Configuring the HP ESCON PA Microcode”](#) section on page 34.

- For general information on HP ESCON PA microcode, refer to the [“HP ESCON PA Microcode Overview” section on page 12](#). For specific instructions to configure the Cisco IOS software to download microcode from the router Flash memory card or SanDisk memory device, refer to the [“Upgrading the HP ESCON PA Microcode from Cisco.com” section on page 33](#).

ESCON Specifications

Table 1 lists the specifications for the ESCON interfaces.

Table 1 *ESCON Specifications*

Characteristic	ESCON Specification
Supported processor I/O architectures	ESA/390
Bit transmission	Serial
Maximum distance (for LED with ESCON)	1.9 miles (3.1 km) point-to-point 5.7 miles (9.2 km) with two ESCON Directors and each hop not exceeding 3 km.
Channel data rate	Up to 17 MBps
Signaling rate	200 Mbps
Cable types	Fiber-optic (62.5/125 micron multimode)
Addition of devices to running systems	Dynamic ¹
Number of addressable devices per channel	256 x 16 x 16 x 253 ²
Connectable control units per channel	Up to 59 (through a 9032 ESCON Director)
Connectable channels per adapter	Up to 59 (through a 9032 ESCON Director); varies by control unit

1. The HP ESCON PA requires dynamic = NO with HCD.
2. Where 256 represents available unit addresses, 16 represents the number of logical partitions (LPARs), 16 represents the number of control unit images, and 253 represents the number of ESCON director paths. It is unlikely a system would have the resources to support the total number of available addresses.

LEDs

The functions of the HP ESCON PA LEDs are as follows:

- **Enabled**—Indicates that the HP ESCON PA is enabled for operation by the system.
- **Present**—Indicates that the ESCON channel is detected by the HP ESCON PA.
- **Loaded**—Indicates that the ESCON channel firmware is completely loaded.
- **Signal**—Indicates that the sync signal has been detected from the ESCON neighbor node.
- **Online**—Indicates that an establish-logical-path request has been received from the channel and that the establish-logical-path request matches one of the paths configured on the HP ESCON PA.

Figure 3 shows the LED indicators.

Figure 3 HP ESCON PA LED Indicators

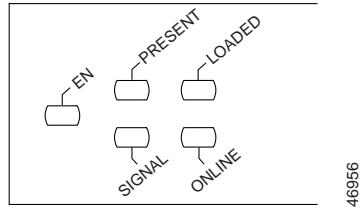


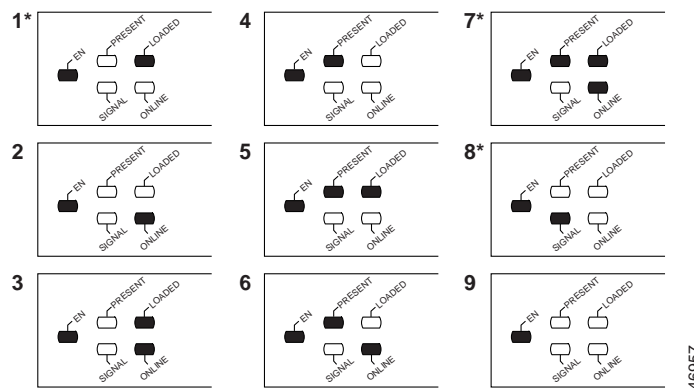
Table 2 shows the HP ESCON PA LED indicator sequences during a cold boot. The ENABLED LED is not part of the following sequences; it remains on during the boot sequence (Figure 4).

Table 2 Cold Boot LED Sequence

Sequence	Present	Loaded	Signal	Online
1	Off	On	Off	Off
2	Off	Off	Off	On
3	Off	On	Off	On
4	On	Off	Off	Off
5	On	On	Off	Off
6	On	Off	Off	On
7	On	On	Off	On
8	Off	Off	On	Off
9 ¹	Off	Off	Off	Off

1. Indicates that the HP ESCON PA is starting to execute the microcode and waiting for commands

Figure 4 LED Boot Sequence

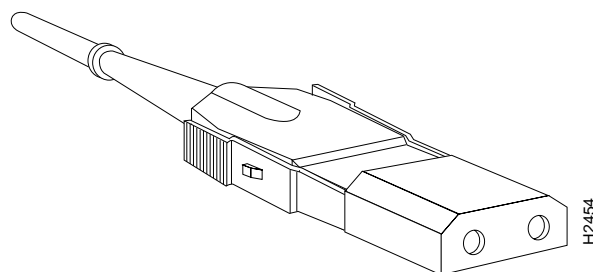


* Because of the short duration of the LEDs, you will typically see only these LED sequences.

ESCON Cable

The ESCON channel interface uses 62.5/125 micrometer, multimode, fiber-optic cable with male duplex connectors at each end (Figure 5). ESCON cables are not available from Cisco. Refer to the ESCON specifications in and contact your cable supplier or the vendor of your host CPU to order the correct ESCON cable.

Figure 5 *ESCON Interface Duplex Connector for the ESCON Channel Port Adapter*



Port Adapter Slot Locations on the Supported Platforms

The following sections provide port adapter slot locations and related information:

- [Cisco 7200 Series Routers and Cisco 7200 VXR Routers Slot Numbering, page 9](#)

Cisco 7200 Series Routers and Cisco 7200 VXR Routers Slot Numbering

Cisco 7204 routers and Cisco 7204VXR routers have four slots for port adapters, and one slot for an input/output (I/O) controller. The slots are numbered from the lower left to the upper right, beginning with slot 1 and continuing through slot 4. You can place a port adapter in any of the slots (slot 1 through slot 4). Slot 0 is always reserved for the I/O controller. The Cisco 7204 router and Cisco 7204VXR router are not shown.

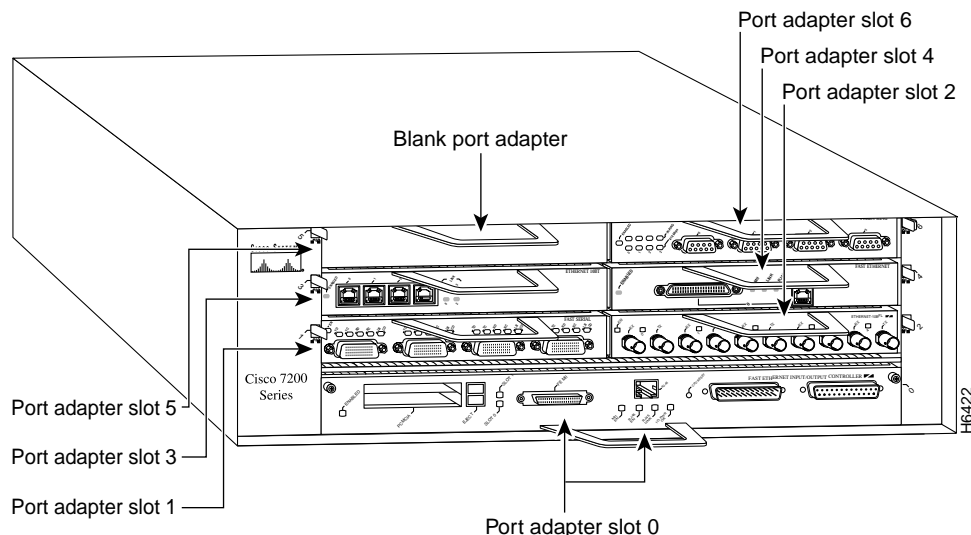
Cisco 7206 routers and Cisco 7206VXR routers have six slots for port adapters, and one slot for an input/output (I/O) controller. The slots are numbered from the lower left to the upper right, beginning with slot 1 and continuing through slot 6. You can place a port adapter in any of the six slots (slot 1 through slot 6). Slot 0 is always reserved for the I/O controller. Figure 6 shows the slot numbering on a Cisco 7206 router. The Cisco 7206VXR router is not shown.



Note

Interface ports are numbered from left to right starting with 0.

Figure 6 Port Adapter Slots in the Cisco 7206 Router



Identifying Interface Addresses

This section describes how to identify the interface addresses for the port adapter slots and ESCON channel port numbers. Interface addresses specify the actual physical location of each interface port on the router.

This address is composed of a two-part number in the format *port-adapter-slot number/interface-port-number*, as follows:

- The first number identifies the port adapter slot in which the HP ESCON PA is installed.
- The second number identifies the interface port on the HP ESCON PA, which is always numbered as interface 0 for the HP ESCON PA.



Note

Some IBM channel attach software features are configured on a *virtual port*. On the CIP cards installed in a Cisco 7500-series router, there are up to two physical ports, numbered 0 and 1, and a virtual port, numbered 2. However, on the HP ESCON PA installed in a Cisco 7200 series router, the single physical port and the virtual port are configured using the same port number identifier, number 0.

Interface ports maintain the same address regardless of whether other port adapters are installed or removed from the slot. However, when you move a port adapter to a different slot, the first number in the address changes to reflect the new port adapter slot number.



Note

The HP ESCON PA is considered a high-speed port adapter; there are specific configuration guidelines that must be observed. Refer to the publication *Cisco 7200 Series Port Adapter Hardware Configuration Guidelines* (Document Number 78-3471-xx), which shipped with your Cisco 7200 series chassis and is also available on the Cisco Connection Documentation, Enterprise Series CD-ROM.

The following subsections describe the interface address formats for the supported platforms:

- [Cisco 7200 Series Routers and Cisco 7200 VXR Routers Interface Addresses, page 11](#)

Table 3 describes the interface addresses for the Cisco 7200 series routers, including Cisco 7200 VXR routers.

Table 3 Identifying Interface Addresses

Platform	Interface Address Format	Numbers	Syntax
Cisco 7200 series routers and Cisco 7200 VXR routers (7204, 7204VXR, 7206, 7206VXR)	Port-adapter-slot-number/interface-port-number	Port adapter slot—1 ¹ through 6 (depends on the number of slots in the router) Interface port—0	1/0

1. Port adapter slot 0 is reserved for the Fast Ethernet port on the I/O controller (if present).

Cisco 7200 Series Routers and Cisco 7200 VXR Routers Interface Addresses

In Cisco 7200 series routers, port adapter slot numbers port adapter slots are numbered from the lower left to the upper right, beginning with port adapter slot 1 and continuing through port adapter slot 4 for the Cisco 7204, and slot 6 for the Cisco 7206. Port adapter slot 0 is reserved for the optional Fast Ethernet port on the I/O controller. For ESCON ports, the individual interface port numbers are always 0.

The interface address is composed of a two-part number in the format *port-adapter-slot-number/interface-port-number*. For example, the ESCON port on an HP ESCON PA in port adapter slot 3 would have the address 3/0. If the HP ESCON PA was in port adapter slot 1, the interface address would be 1/0.

Preparing for Installation

This section describes the general equipment, safety, and site preparation requirements for installing the HP ESCON PA. It also includes microcode overview information. This section contains the following subsections:

- [Required Tools and Equipment, page 12](#)
- [HP ESCON PA Microcode Overview, page 12](#)
- [Hardware and Software Requirements, page 13](#)
- [Checking Hardware and Software Compatibility, page 14](#)
- [Safety Guidelines, page 15](#)
- [Laser LED Safety Information, page 18](#)

Required Tools and Equipment

You need the following parts and tools to install an HP ESCON PA. If you need additional equipment, contact a service representative for ordering information.

- HP ESCON PA
- ESCON interface cables
- ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, field-replaceable units (FRUs), and spares
- An antistatic mat on which you can place the removed port adapter
- An antistatic container in which you can place the failed port adapter for shipment to the factory

HP ESCON PA Microcode Overview

Microcode, also known as firmware, is a set of processor-specific software instructions that enables and manages the features and functions of a specific port adapter type. At system startup or reload, the system loads the microcode for each port adapter type present in the system.

The entire HP ESCON PA microcode image is delivered on a router Flash memory card or SanDisk memory device, or you can download it from Cisco.com.

New microcode is released to enable new features, improve performance, or fix known problems in earlier versions. The Cisco 7200 series routers support downloadable software and microcode images for most upgrades. This support lets you download new or upgraded images remotely, store the images in router memory, and load the new images at system startup without physically accessing the router. You can store multiple versions of an image in Flash or SanDisk memory for a specific processor type, and use configuration commands to specify which version of the image loads at startup. All port adapters of the same type (for example, all HP ESCON PA port adapters) use the same microcode image.

By default, the HP ESCON PA microcode is loaded from the router Flash memory card or SanDisk memory device for the Cisco 7200 series routers. The default HP ESCON PA microcode version is found by entering the **show microcode** command.

The following example is a partial display of the **show microcode** command output:

```
Router# show microcode
Microcode images for downloadable hardware
HW Type                Microcode image names
-----
ecpa    default    slot0:xcpa28-0
        configured slot0:xcpa218-2
pcpa    default    slot0:xcpa28-0
```



Note

In Cisco IOS Release 12.1(5)T or later, the filenames of all released HP ESCON PA microcode images use the conventions *xcpa28-*nn** (for example, *xcpa28-1*). Interim pre-release versions of HP ESCON PA microcode images use the convention *xcpa218-*nnn** (for example, *xcpa218-2*).

Hardware and Software Requirements

The **show version** command displays the current hardware configuration of the router, including the system software version that is loaded and running. For the HP ESCON PA, the **show microcode** command lists the recommended and the configured microcode version. The **show controller** command shows the microcode version running on the HP ESCON PA in the router.

To view the current version of software or microcode stored on the router Flash memory card, use the **show flash slot0:** or the **dir slot0:** EXEC commands. Refer to the “[Upgrading Your HP ESCON PA Microcode](#)” section on page 33 for basic configuration information.

If the displays indicate that the required system software and microcode are not available in your system, refer to the “[Obtaining Documentation, Obtaining Support, and Security Guidelines](#)” section on page 3 or contact a service representative for upgrade information.

The following subsections indicate the minimum hardware and software requirements for each supported platform:

- [Cisco 7200 Series Routers and Cisco 7200 VXR Routers Hardware and Software Requirements, page 13](#)

Cisco 7200 Series Routers and Cisco 7200 VXR Routers Hardware and Software Requirements

The minimum hardware and software requirements for the HP ESCON PA on Cisco 7200 series and Cisco 7200 VXR series routers are:

- The HP ESCON PA is used in the Cisco 7200 series routers and can be installed in any available port adapter slot.
- The Cisco 7200 series router requires a minimum of 32 MB of dynamic RAM (DRAM). The HP ESCON PA is a high-speed interface (100 bandwidth points).



Note

For port adapter hardware and memory configuration guidelines for the Cisco 7200 series routers, refer to the document *Cisco 7200 Series Port Adapter Hardware Configuration Guidelines* at the following URL:

http://www.cisco.com/en/US/products/hw/modules/ps2033/products_configuration_guide_book09186a00801056ef.htm

- The HP ESCON PA requires that the Cisco 7200 series router is running Cisco IOS Release 12.1(5)T or later.

Table 4 lists the specific Cisco IOS software images that are compatible with the HP ESCON PA.

Table 4 Cisco IOS Release Image Names

Cisco IOS Release	Image Names
Release 12.1(5)T	c7200-aejs-mz c7200-aejs40-mz c7200-aejs56i-mz c7200-ajs-mz c7200-ajs40-mz c7200-ajs56i-mz c7200-js-mz c7200-js40-mz c7200-js56i-mz c7200-ds-mz c7200-ds40-mz c7200-ds56i-mz

Table 5 specifies the recommended minimum level of HP ESCON PA microcode for the corresponding Cisco IOS release.

Table 5 Cisco IOS Releases and HP ESCON PA Microcode Image

Cisco IOS Release	HP ESCON PA Image
Release 12.1(5)T	xcpa28-0

For the latest Cisco IOS release that supports the HP ESCON PA on the Cisco 7200 series routers, refer to “Checking Hardware and Software Compatibility” section on page 14.

Checking Hardware and Software Compatibility

To check the minimum software requirements of Cisco IOS software with the hardware installed on your router, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether modules within a system are compatible, but it does provide the minimum IOS requirements for individual hardware modules or components.



Note

Access to this tool is limited to users with Cisco.com login accounts.

To access Software Advisor, click **Log In** at Cisco.com and go to Support > Tools and Resources. You can also access the tool by pointing your browser directly to http://www.cisco.com/en/US/support/tsd_most_requested_tools.html.

Choose a product family or enter a specific product number to search for the minimum supported software release needed for your hardware.

Safety Guidelines

This section provides safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement.



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelyyn liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR**Figyelem FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**警告 重要的安全性说明**

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis.
- Do not work alone when potentially hazardous conditions exist and never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. Port adapters and processor modules comprise printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, use a preventive antistatic strap during handling.

The following guidelines help prevent ESD damage:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- When installing a component use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that bus connectors are properly seated.
- When removing a component use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap only protects components from ESD voltages on the body; ESD voltages on clothing can still cause damage.
- Never attempt to remove the printed circuit board from the metal carrier.



Caution

For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohm.

Laser LED Safety Information

The HP ESCON PA contains laser LEDs. The expansion module is classified as a Class 1 laser product and is certified to conform to the requirements of EN60825-1:1994 and IEC825-1:1993.

Class 1 laser products are not considered hazardous. The HP ESCON PA has embedded Class 3a laser LED assemblies operating at a nominal wavelength of 850 nanometer and a maximum potential output power of 1.25 milliwatts. The design of the HP ESCON PA incorporates engineering features including current limiting, which ensures that there is no human access to LED radiation greater than Class 1 under any set of operating, maintenance, or service conditions, including a single fault.

There are fewer than 0.442 milliwatts propagating in the link or in any portion of the module. Therefore, according to IEC825-2:1993, Hazard Level 1 prevails in all parts of the system.

The LEDs are located on the front face of the module.

Laser Radiation



Warning

Laser radiation is present when the system is open. Statement 1009

Waarschuwing

Laserstraling is aanwezig wanneer het systeem open is.

Varoitus

Lasersäteitä järjestelmän ollessa avoinna.

Attention

Production d'un rayonnement laser en position ouverte.

Warnung

Laserstrahlung in geöffnetem Zustand.

Avvertenza

Emissione di radiazioni laser quando il sistema è aperto.

Advarsel

Laserstråling er til stede når enheten er åpen.

Aviso

Radiação laser presente quando aberto.

¡Advertencia!

Radiación láser presente cuando el sistema está abierto.

Varning!

Laserstrålning pågår när enheten är öppen.

Figyelem

A rendszer burkolatának eltávolításakor lézersugárzás van jelen.

Предупреждение

Открытое устройство испускает лазерное излучение.

警告

打开系统后会发生激光辐射。

警告

システムを開いた状態では、レーザーが放射されています。

Staring into Laser Beam



Warning Do not stare into the laser beam. Statement 1010

Waarschuwing Niet in de straal staren.

Varoitus Älä katso säteeseen.

Attention Ne pas fixer le faisceau des yeux.

Warnung Nicht direkt in den Strahl blicken.

Avvertenza Non fissare il raggio con gli occhi.

Advarsel Stirr ikke på strålen.

Aviso Não olhe fixamente para o raio.

¡Advertencia! No mirar fijamente el haz.

Varning! Laserstrålning när enheten är öppen.

Figyelem Ne nézzen bele a lézersugárba!

Предупреждение Не допускайте попадания лазерного луча в глаза.

警告 请勿直视激光束。

警告 レーザー光線をのぞきこまないでください。

Removing and Installing Port Adapters

This section describes how to remove port adapters from supported platforms and also how to install new or replacement port adapters. This section contains the following subsections:

- [Handling Port Adapters, page 21](#)
- [Online Insertion and Removal, page 22](#)
- [Port Adapter Removal and Installation, page 23](#)
- [Attaching the HP ESCON PA to the Channel, page 25](#)

Handling Port Adapters

Each port adapter circuit board is mounted to a metal carrier and is sensitive to electrostatic discharge (ESD) damage.



Note

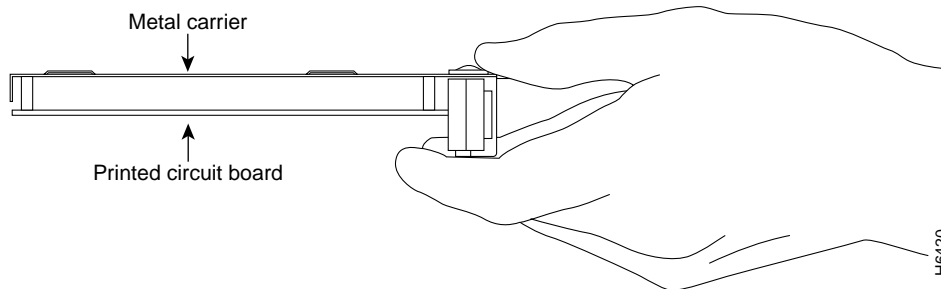
When a slot is not in use, a blank port adapter must fill the empty slot to allow the router or switch to conform to electromagnetic interference (EMI) emissions requirements and to allow proper airflow across the installed port adapters. If you plan to install a new port adapter in a slot that is not in use, you must first remove the blank port adapter.



Caution

Always handle the port adapter by the carrier edges and handle; never touch the port adapter components or connector pins. Always use an ESD wrist strap when handling equipment. (See [Figure 7](#).)

Figure 7 Handling a Port Adapter



Online Insertion and Removal

The Cisco 7200 series routers, including Cisco 7200 VXR routers, support online insertion and removal (OIR) of all port adapters. You do not need to power down the router when removing and replacing an HP ESCON PA.

**Note**

As you disengage the module from the router or switch, OIR administratively shuts down all active interfaces in the port adapter.

OIR allows you to install and replace port adapters while the router is operating; you do not need to notify the software or shut down the system power, although you should not run traffic through the port adapter you are removing while it is being removed. OIR is a method that is seamless to end users on the network, maintains all routing information, and preserves sessions.

It is wise to gracefully shut down the system before removing a port adapter that has active traffic moving through it. Removing a module while traffic is flowing through the ports can cause system disruption. Once the port adapter is inserted, the ports can be brought back up.

The following is a functional description of OIR for background information only; for specific procedures for installing and replacing a port adapter in a supported platform, refer to the [“Port Adapter Removal and Installation” section on page 23](#).

Each port adapter has a bus connector that connects it to the router. The connector has a set of tiered pins in three lengths that send specific signals to the system as they make contact with the port adapter. The system assesses the signals it receives and the order in which it receives them to determine if a port adapter is being removed from or introduced to the system. From these signals, the system determines whether to reinitialize a new interface or to shut down a disconnected interface.

Specifically, when you insert a port adapter, the longest pins make contact with the port adapter first, and the shortest pins make contact last. The system recognizes the signals and the sequence in which it receives them.

When you remove or insert a port adapter, the pins send signals to notify the system of changes. The router then performs the following procedure:

1. Rapidly scans the system for configuration changes.
2. Initializes newly inserted port adapters or administratively shuts down any vacant interfaces.
3. Brings all previously configured interfaces on the port adapter back to their previously installed state. Any newly inserted interface is put in the administratively shutdown state, as if it was present (but not configured) at boot time. If a similar port adapter type is reinserted into a slot, its ports are configured and brought online up to the port count of the originally installed port adapter of that type.

**Note**

Before you begin installation, read the [“Required Tools and Equipment” section on page 12](#) for a list of parts and tools required for installation.

Port Adapter Removal and Installation

In this section, the illustrations that follow give step-by-step instructions on how to remove and install port adapters. Although the procedures may refer to a particular type of port adapter, the steps are the same for installing and removing all types of port adapters. This section contains the following illustrations:

- [Cisco 7200 Series Routers and Cisco 7200 VXR Routers—Removing and Installing a Port Adapter, page 24](#)



Caution

When performing the following procedures, wear a grounding wrist strap to avoid ESD damage to the card. Some platforms have an ESD connector for attaching the wrist strap.



Warning

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. Statement 1034



Caution

When powering off the router, wait a minimum of 30 seconds before powering it on again.

Cisco 7200 Series Routers and Cisco 7200 VXR Routers—Removing and Installing a Port Adapter

Step 1

To remove the port adapter, place the port adapter lever in the unlocked position. (See A.) The port adapter lever remains in the unlocked position.

Step 2

Grasp the handle of the port adapter and pull the port adapter from the router, about halfway out of its slot. If you are removing a blank port adapter, pull the blank port adapter completely out of the chassis slot.

Step 3

With the port adapter halfway out of the slot, disconnect all cables from the port adapter. After disconnecting the cables, pull the port adapter from its chassis slot.

Step 4

To insert the port adapter, carefully align the port adapter carrier between the upper and the lower edges of the port adapter slot. (See B.)

Step 5

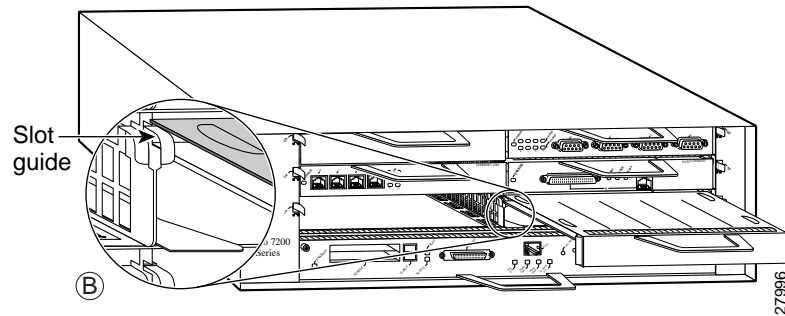
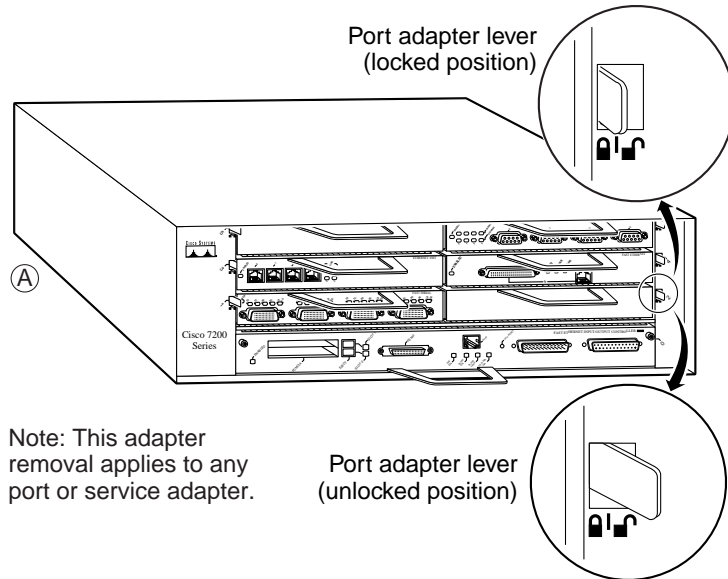
Carefully slide the new port adapter halfway into the port adapter slot. (See B.)

Step 6

With the port adapter halfway into the slot, connect all required cables to the port adapter. After connecting all required cables, carefully slide the port adapter all the way into the slot until the port adapter is seated in the router midplane.

Step 7

After the port adapter is properly seated, lock the port adapter lever. (See A.)



Attaching the HP ESCON PA to the Channel



Caution

We recommend that an authorized service representative or other qualified service person perform the following procedure. To prevent hardware problems with your host processor, all the channel connections must be tight. A loose connection can cause the host processor or its channel to halt. Every cable must be tightly seated in its connector.

To attach the ESCON cable between the HP ESCON PA and the host channel:

- Step 1** Use the **shutdown** interface command on the router to shut down the HP ESCON PA interface. This action prevents excessive error messages from being sent to the router log output. In addition, we recommend that you vary offline the host channel to which the HP ESCON PA will be attached.

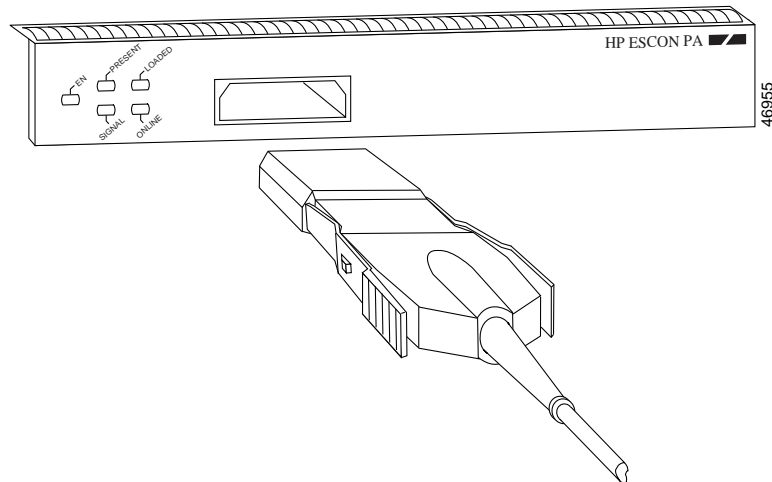


Note

For instructions on how to vary offline the host channel, refer to the documentation for your mainframe operating system.

- Step 2** Attach an ESCON cable between the HP ESCON PA and the host channel ([Figure 8](#)). Make certain the ESCON cable plug “clicks” in place in the receptacle on the HP ESCON PA. Connection problems may result if the plug does not click in place.
- Step 3** Visually inspect the connection to make sure it is not loose.

Figure 8 Connecting an ESCON Cable to an HP ESCON PA



To an ESCON Director
(switch) or host CPU

- Step 4** Vary online the host channel. For instructions on how to vary the host channel online, refer to the documentation for your mainframe operating system.
- Step 5** Use the **no shutdown** interface configuration command to enable the HP ESCON PA interface.

Configuring the HP ESCON PA

To continue your port adapter installation, you must configure the HP ESCON PA interface. The instructions that follow apply to all supported platforms. Minor differences among the platforms—with Cisco IOS software commands—are noted.

This section contains the following subsections:

- [Using the EXEC Command Interpreter, page 26](#)
- [Configuring the HP ESCON PA Interface, page 27](#)
- [Checking the Configuration, page 28](#)
- [Upgrading Your HP ESCON PA Microcode, page 33](#)
- [Using Flash Memory, page 36](#)
- [Using SanDisk Devices, page 38](#)
- [Running HP ESCON PA Diagnostic Tests, page 39](#)

Using the EXEC Command Interpreter

You modify the configuration of your router through the software command interpreter called the EXEC (also called enable mode). You must enter the privileged level of the EXEC command interpreter with the **enable** command before you can use the **configure** command to configure a new interface or to change the existing configuration of an interface. The system prompts you for a password if one has been set. The system prompt for the privileged level ends with a pound sign (#) instead of an angle bracket (>).

At the console terminal, use the following procedure to enter the privileged level:

-
- Step 1** At the user-level EXEC prompt, enter the **enable** command. The EXEC prompts you for a privileged-level password as follows:

```
Router> enable
Password:
```

- Step 2** Enter the password (the password is case sensitive). For security purposes, the password is not displayed. When you enter the correct password, the system displays the privileged-level system prompt (#):

```
Router#
```

Configuring the HP ESCON PA Interface

After you verify that the new HP ESCON PA is installed correctly, use the **configure** command to configure the new interfaces. The enabled LED (EN) goes on when the port adapter is installed correctly (Figure 3). Before you begin to configure the interface, be prepared with the following information:

- Protocols and encapsulations you plan to use on the new interfaces.
- Protocol-specific information, such as internet protocol (IP) addresses if you will configure the interfaces for IP routing.
- Special services you plan to use on the interface, such as Common Link Access for Workstations (CLAW), offload support, TN3270 server support, CIP SNA, or Cisco MultiPath Channel. For more information on these special services, see the *Cisco IOS Bridging and IBM Networking Configuration Guide*.

If you installed a new HP ESCON PA interface or if you want to change the configuration of an existing interface, you must enter configuration mode to configure the new interfaces. If you replaced an HP ESCON PA that was previously configured, the system will recognize the new HP ESCON PA interface and bring it up in its existing configuration. An HP ESCON PA removed from one slot and replaced in another slot must be reconfigured.



Note

Configuration commands are executed from the privileged level of the EXEC command interpreter, which usually requires password access. Refer to the “Using the EXEC Command Interpreter” section on page 26 and contact your system administrator, if necessary, to obtain access.

The following sections provide specific information about configuring the HP ESCON PA interface:

- [Performing a Basic Interface Configuration, page 27](#)

Performing a Basic Interface Configuration

This section describes the procedure for performing a basic configuration of an HP ESCON PA interface.

Press the **Return** key after each step unless otherwise noted. At any time you can exit the privileged level and return to the user level by entering **disable** at the prompt as follows:

```
Router# disable
Router>
```

The following example describes a basic configuration procedure:

- Step 1** Enter configuration mode and specify that the console terminal will be the source of the router configuration commands, as follows:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```

- Step 2** At the prompt, enter the interface configuration mode by using the **interface** configuration command. The following example prepares you to configure the interface on the channel port adapter in slot 2, port 0:
- ```
Router(config)# interface channel 2/0
```
- Step 3** If IP routing is enabled on the system, you can assign an IP address and subnet mask to the interface with the **ip address** interface configuration, as in the following example:
- ```
Router(config-if)# ip address 1.1.1.10 255.255.255.0
```
- Step 4** Add any additional configuration subcommands required to enable routing protocols and set the interface characteristics.
- Step 5** Change the shutdown state to up and enable the interface as follows:
- ```
Router(config-if)# no shutdown
```
- Step 6** Configure additional interfaces as required.
- Step 7** When you have included all configuration commands to complete the configuration, press **Ctrl-Z** to exit configuration mode. You may also type **end** to exit configuration mode and return to the EXEC prompt.
- Step 8** Write the new configuration to nonvolatile memory as follows:
- ```
Router# copy running-config startup-config
[OK]
Router#
```
-

For complete descriptions of interface subcommands and the configuration options available for each platform, refer to the publications listed in the [“Related Documentation” section on page 3](#).

To check the interface configuration using **show** commands, see the [“Checking the Configuration” section on page 28](#).

Checking the Configuration

After configuring the new interface, use the **show** commands to display the status of the new interface or all interfaces and use the **ping** command to check connectivity. This section includes the following subsections:

- [Using show Commands to Verify the New Interface Status, page 28](#)
- [Using the Ping Command to Verify Network Connectivity, page 32](#)

Using show Commands to Verify the New Interface Status

Use **show** commands to verify that the new interfaces are configured and operating correctly, as follows:

- Step 1** Display the system hardware configuration with the **show version** command. Ensure that the list includes the new interfaces.
- Step 2** Display all the current port adapters and their interfaces with the **show controllers** command. Verify that the new HP ESCON PA appears in the correct slot.

- Step 3** Specify one of the new interfaces with the **show interfaces** *port adapter type slot/interface* command and verify that the first line of the display specifies the interface with the correct slot number. Also verify that the interface and line protocol are in the correct state: up or down.
- Step 4** Display the protocols configured for the entire system and specific interfaces with the **show protocols** command. If necessary, return to configuration mode to add or remove protocol routing on the system or specific interfaces.
- Step 5** Display the running configuration file with the **show running-config** command. Display the configuration stored in nonvolatile RAM (NVRAM) using the **show startup-config** command. Verify that the configuration is accurate for the system and each interface.

If the interface is down and you configured it as up, or if the displays indicate that the hardware is not functioning properly, ensure that the network interface is properly connected and terminated. If you still have problems bringing up the interface, contact a service representative for assistance.

This section includes the following subsections:

- [Using the show version or show hardware Commands, page 29](#)
- [Using the show controllers Commands, page 30](#)
- [Using the show diag Command, page 31](#)
- [Using the show interfaces Commands, page 31](#)

Using the show version or show hardware Commands

Display the configuration of the router hardware, the software version, the names and sources of configuration files, and the boot images using the **show version** (or **show hardware**) command.



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Cisco 7200 Series and Cisco 7200 VXR Series Routers—Example Output of the show version Command

Following is an example of the **show version** command from a Cisco 7200 series router:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-IS56I-M), Released Version 12.1
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Thu 27-Jul-00 13:22 by biff
Image text-base: 0x60008960, data-base: 0x613C4000

ROM: System Bootstrap, Version 12.1 RELEASE SOFTWARE (f)
BOOTFLASH: 7200 Software (C7200-BOOT-M), Version 12.1, RELEASE SOFTWARE R

router uptime is 5 hours, 6 minutes
System returned to ROM by reload at 04:35:10 UTC Thu Aug 10 2000
System image file is "tftp://181.23.250.2/jdoe/c7200-is56i-mz.121-5.T"

cisco 7206VXR (NPE300) processor (revision B) with 122880K/40960K bytes of memo.
Processor board ID 15463825
R7000 CPU at 262Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
6 slot VXR midplane, Version 2.0

Last reset from power-on
Bridging software.
```

```

X.25 software, Version 3.0.0.
4 Ethernet/IEEE 802.3 interface(s)
3 FastEthernet/IEEE 802.3 interface(s)
2 IBM channel interface(s)
125K bytes of non-volatile configuration memory.

20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x100

```

Using the show controllers Commands

Display all the current interface processors and their interfaces using the **show controllers** command.



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Cisco 7200 Series and Cisco 7200 VXR Series Routers—Example Output of the show controllers Command

Following is an example of the **show controllers** command that displays information about a specific HP ESCON PA:

```

Router# show controllers channel 2/0
ECPA 2, hardware version 1.0, microcode version 218.6
  Mailbox commands:0 forevers, 0 max elapsed usecs
  Microcode loaded from flash slot0:xcpa218-6_kernel_ecpa4
  Loaded:seg_802          Rev. 0   Compiled by jdoe on Thu 07-Sep-2000 12:
  Loaded:seg_csna        Rev. 0   Compiled by jdoe on Thu 07-Sep-2000 12:
  Loaded:seg_eca         Rev. 0   Compiled by jdoe on Thu 07-Sep-2000 12:
  Loaded:seg_sslc       Rev. 0   Compiled by jdoe on Thu 07-Sep-2000 12:
  Loaded:seg_tcpip      Rev. 0   Compiled by jdoe on Thu 07-Sep-2000 12:
  Loaded:seg_tn3270     Rev. 0   Compiled by jdoe on Thu 07-Sep-2000 12:
  EPROM version 0.0, VPLD version 0.0
  ECA0:hw version 02, microcode version C50602D4
Load metrics:
  Memory      dram 118412048/128M
  CPU         1m  1%, 5m  2%, 60m  2%
  DMA        1m  1%, 5m  0%, 60m  0%
  ECA0       1m  0%, 5m  0%, 60m  0%
Interface Channel2/0
Hardware is Escon Channel
HW Registers CPU init=0x021441A0 LED control=0x00045DDF Reset Satus=0x00000002
HW Poll Register 4B0D5240:[00000001]

Free buffer queues
  queue=0 max_entries=128 size=600 head=71 ring=4B0EB060
  queue=1 max_entries=32 size=4520 head=23 ring=4B07D380
  queue=2 max_entries=64 size=4520 head=63 ring=4B07D440
Tx Queues
  queue=0 head=0 tail=0 tx_cnt=0 tx_pakcnt=0
  max_entries=128 type=1 poll_index=0 ring=4B07D580
  fspak buffers swapped out=0
  queue=1 head=12 tail=12 tx_cnt=0 tx_pakcnt=0
  max_entries=32 type=2 poll_index=1 ring=4B0EB2A0
  fspak buffers swapped out=0
Rx Queues
  max_entries=221 poll_index=3 head=96 ring=4B0EB3E0

```

Using the show diag Command

Display the type of port adapter installed in your system using the **show diag** command.



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Cisco 7200 Series and Cisco 7200 VXR Series Routers—Example Output of the show diag Command

Following is an example of the **show diag** command from a Cisco 7200 series router with an HP ESCON PA installed in port adapter slot 4:

```
Router# show diag 2
Slot 2:
  Escon Port adapter, 1 port
  Port adapter is analyzed
  Port adapter insertion time 00:05:00 ago
  EEPROM contents at hardware discovery:
  Hardware Revision       :1.0
  Top Assy. Part Number   :800-06347-02
  Part Number             :73-4454-02
  Board Revision         :02
  PCB Serial Number      :18902852000
  RMA History            :00
  Fab Version            :02
  Fab Part Number        :28-3405-02
  Product Number         :PA-4C-EB
  EEPROM format version 4
  EEPROM contents (hex):
  0x00:04 FF 40 02 10 41 01 00 C0 46 03 20 00 18 CB 02
  0x10:82 49 11 66 02 42 30 32 C1 8B 31 38 39 30 32 38
  0x20:35 32 30 30 30 04 00 02 02 85 1C 0D 4D 02 CB 94
  0x30:50 41 2D 34 43 2D 45 42 00 00 00 00 FF FF FF FF
  0x40:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
  0x50:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
  0x60:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
  0x70:FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

Using the show interfaces Commands

Display information about a specific interface using the **show interfaces** command.



Note

The outputs that appear in this document may not match the output you receive when running these commands. The outputs in this document are examples only.

Cisco 7200 Series and Cisco 7200 VXR Series Routers—Example Output of the show interfaces Command

Following is an example of the **show interfaces channel** command for an HP ESCON PA in port adapter slot 4:

```
Router# show interface channel 4/0
Channel4/0 is up, line protocol is up
  Hardware is Escon Channel
  Internet address is 10.10.99.1/24
  MTU 4472 bytes, BW 98304 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation CHANNEL, loopback not set
  ECA adapter card
```

```

Data transfer rate 12 Mbytes, number of subchannels 0
Last input 00:14:09, output 00:00:58, output hang never
Last clearing of "show interface" counters never
Queueing strategy: fifo
Output queue 0/40, 69129 drops; input queue 0/75, 0 drops
5 minute input rate 220000 bits/sec, 239 packets/sec
5 minute output rate 289000 bits/sec, 252 packets/sec
  788256 packets input, 84718668 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  1378169 packets output, 680323725 bytes, 0 underruns
    0 output errors, 0 collisions, 7 interface resets
    0 output buffer failures, 0 output buffers swapped out

```

With the **show interfaces** command, use arguments such as the interface type and the port adapter slot and port number to display information about a specific HP ESCON PA.

For complete command descriptions and examples for the Cisco 7200 series routers, refer to the publications listed in the [“Related Documentation” section on page 3](#).

Using the Ping Command to Verify Network Connectivity

Use the **ping** command to verify that an interface port is functioning properly and to check the path between a specific port and connected devices at various locations on the network. This section provides brief descriptions of the **ping** command. After you verify that the system has booted successfully and is operational, you can use the **ping** command to verify the status of interface ports.

The **ping** command sends an echo request out to a remote device at the IP address that you specify. After sending a series of signals, the command waits a specified time for the remote device to echo the signals. Each returned signal is displayed as an exclamation point (!) on the console terminal; each signal that is not returned before the specified time-out is displayed as a period (.). A series of exclamation points (!!!!!) indicates a good connection; a series of periods (.....) or the messages “timed out” or “failed” indicate that the connection failed.

The following example shows a successful **ping** command to a remote server with the IP address 1.1.1.10:

```

Router# ping 1.1.1.10
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 1.1.1.10, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/64 ms
Router#

```

If the connection fails, verify that you have the correct IP address for the server and that the server is active, then repeat the **ping** command.

For complete descriptions of interface configuration commands and the configuration options available for each platform, refer to the publications listed in the [“Related Documentation” section on page 3](#).

Upgrading Your HP ESCON PA Microcode

The following sections discuss HP ESCON PA microcode configuration requirements:

- [How Does HP ESCON PA Microcode Ship?, page 33](#)
- [Upgrading the HP ESCON PA Microcode from Cisco.com, page 33](#)
- [Configuring the HP ESCON PA Microcode, page 34](#)

For additional information about specific microcode requirements, refer to the “[Hardware and Software Requirements](#)” section on page 13.

How Does HP ESCON PA Microcode Ship?

For the Cisco 7200 series routers, when the HP ESCON PA is ordered as part of a new system, the HP ESCON PA microcode is available on a Flash memory card or SanDisk memory device (which also includes the Cisco IOS release compatible with the microcode version) and via Cisco.com. When the HP ESCON PA is ordered as a spare, the HP ESCON PA microcode is available via Cisco.com.



Note

The HP ESCON PA-compatible microcode images are virtually bundled with all Cisco IOS releases that support HP ESCON PAs. The virtual bundling of the microcode means that the microcode software is loaded separately by the Cisco IOS software.

Upgrading the HP ESCON PA Microcode from Cisco.com

To upgrade the HP ESCON PA microcode obtained from Cisco.com, complete the following steps:



Note

Perform the following procedure only if you are upgrading your microcode.



Caution

To prevent system problems in the following procedure, you must be running Cisco IOS Release 12.1(5)T or later. For information on upgrading your Cisco IOS software, refer to the appropriate software configuration publication listed in the “[Hardware and Software Requirements](#)” section on page 13.



Caution

The microcode ECPA commands in this section will affect both the HP ESCON PA and earlier versions of the ECPA if both types of port adapters are installed in the router.

To upgrade HP ESCON PA microcode images obtained from Cisco.com:

- Step 1** Download the HP ESCON PA microcode image from Cisco.com to a TFTP server.
- Step 2** Remove any configuration commands that specify a HP ESCON PA microcode image from the running configuration.
- Step 3** Copy the HP ESCON PA microcode image to the Flash memory card in slot 0 or slot1, or to the SanDisk memory device in disk 0 or disk 1.

- Step 4 Reconfigure the router, as necessary, to use the HP ESCON PA microcode image stored in the Flash memory card in slot 0 or slot 1, or in the SanDisk memory device in disk 0 or disk 1.
- Step 5 Save your running configuration to a TFTP server, Flash memory, or SanDisk memory.
- Step 6 Perform a microcode reload.

Configuring the HP ESCON PA Microcode

This section describes how to modify the startup configuration to load different microcode images at startup, or to change existing configuration instructions and re-enable the system default.

At system startup or reload, the system loads a microcode image for each processor type. All processors of the same type use the same microcode image; only one image for each type can load at startup. The HP ESCON PA microcode image must be located on a Flash memory card or SanDisk memory device.

When you upgrade software or microcode by downloading new images onto a Flash memory card or SanDisk memory device, you must configure the system to load the new microcode image at startup. Otherwise, the system will continue to load the default image from the system or attempt to load any previous image if it is still specified in the system configuration file.



Note

If you are running any image other than the default HP ESCON PA microcode and you want to upgrade to a later version of Cisco IOS software and use the default HP ESCON PA microcode that comes with that later Cisco IOS version, you must remove the **microcode ecpa slot:filename** statement from the system configuration file. If you do not remove the **microcode ecpa slot:filename** statement from the system configuration file, the Cisco IOS software will try to load the old version of the HP ESCON PA microcode.

To instruct the system to load an HP ESCON PA microcode image other than the default at startup, use the **microcode ecpa slot:filename** and the **microcode reload** configuration commands to add the instructions to the configuration file.

To load a microcode image from a file stored on a Flash memory card, enter the **show flash slot0: EXEC** command to display the Flash directory contents and verify the exact name of the file (**xcpa28-1** is used in this example):

```
Router> show flash
-#- ED --type-- --crc--- --seek-- nlen -length- ----date/time----- name
1  .. unknown CA94D289 20C18 13 2966 Sep 07 2000 09:07:07 ciscocert.pem
2  .D unknown 62000000 20C9C 9 1 Sep 18 2000 06:33:57 xcpa218-6
3  .D unknown 2B04BACB 94134 22 472086 Sep 18 2000 06:33:58 xcpa218-6_kernel_ecpa4
4  .D unknown 348776FF F9690 21 414940 Sep 18 2000 06:34:21 xcpa218-6_kernel_xcpa
5  .D unknown BC7BEC5D 1358B8 17 246184 Sep 18 2000 06:34:42 xcpa218-6_seg_802
6  .D unknown C09633A6 1BEFAC 18 562804 Sep 18 2000 06:34:55 xcpa218-6_seg_cmpc

7  .D unknown 0B58D705 1D6914 18 96488 Sep 18 2000 06:35:23 xcpa218-6_seg_csna
8  .D unknown 29DEAA84 24713C 17 460712 Sep 18 2000 06:35:28 xcpa218-6_seg_eca
9  .D unknown 95CADB93 25D904 21 91976 Sep 18 2000 06:35:51 xcpa218-6_seg_offload
10 .D unknown 82F8A3D6 26E670 17 68844 Sep 18 2000 06:35:56 xcpa218-6_seg_pca
11 .D unknown 7EECB670 272374 18 15492 Sep 18 2000 06:35:59 xcpa218-6_seg_push
12 .D unknown B4A58886 33C564 18 827760 Sep 18 2000 06:36:00 xcpa218-6_seg_sslc
13 .D unknown 73CB2859 363B90 19 161196 Sep 18 2000 06:36:41 xcpa218-6_seg_tcpip
14 .D unknown 0989F473 409EF0 20 680672 Sep 18 2000 06:36:49 xcpa218-6_seg_tn3270
15 .. unknown 62000000 409F74 9 1 Sep 18 2000 06:46:12 xcpa218-6
16 .. unknown 2B04BACB 47D40C 22 472086 Sep 18 2000 06:46:12 xcpa218-6_kernel_ecpa4
17 .. unknown 348776FF 4E2968 21 414940 Sep 18 2000 06:46:35 xcpa218-6_kernel_xcpa
```

```

18 .. unknown BC7BEC5D 51EB90 17 246184 Sep 18 2000 06:46:56 xcpa218-6_seg_802
19 .. unknown C09633A6 5A8284 18 562804 Sep 18 2000 06:47:09 xcpa218-6_seg_cmpc
20 .. unknown 0B58D705 5BFBEC 18 96488 Sep 18 2000 06:47:37 xcpa218-6_seg_csna
21 .. unknown 29DEAA84 630414 17 460712 Sep 18 2000 06:47:42 xcpa218-6_seg_eca
22 .. unknown 95CADB93 646BDC 21 91976 Sep 18 2000 06:48:05 xcpa218-6_seg_offload
23 .. unknown 82F8A3D6 657948 17 68844 Sep 18 2000 06:48:10 xcpa218-6_seg_pca
24 .. unknown 7EECB670 65B64C 18 15492 Sep 18 2000 06:48:13 xcpa218-6_seg_push
25 .. unknown B4A58886 72583C 18 827760 Sep 18 2000 06:48:14 xcpa218-6_seg_sslc
26 .. unknown 73CB2859 74CE68 19 161196 Sep 18 2000 06:48:56 xcpa218-6_seg_tcpip
27 .. unknown 0989F473 7F31C8 20 680672 Sep 18 2000 06:49:04 xcpa218-6_seg_tn3270

```

12373560 bytes available (8204744 bytes used)

To configure the microcode for an HP ESCON PA on a router configured with Cisco IOS Release 12.1(5)T or later:

Step 1 Enter the privileged EXEC configuration mode using the **enable** command:

```

Router> enable
Password:
Router#

```



Note For complete information on the privileged EXEC configuration mode, refer to the [“Using the EXEC Command Interpreter”](#) section on page 26.

Step 2 If you need to copy a new HP ESCON PA microcode image to your router’s Flash memory, refer to the [“Using Flash Memory”](#) section on page 36, then proceed to Step 3.

Step 3 In privileged EXEC configuration mode, enter global configuration mode and specify that the console terminal will be the source of the configuration subcommands:

```

Router# configure terminal

```

To load the microcode from an individual microcode image that is stored as a file on a Flash memory card, enter the **microcode** command, the processor type, the specific memory location of the HP ESCON PA microcode image, and the exact argument for *filename* (**xcpa28-1** is used in this example):

```

Router(config)# microcode ecpa slot0:xcpa28-1
Router(config)# microcode reload

```



Note The **microcode reload** command is written automatically in the configuration file following the **microcode ecpa** command when you modify the system default to load a microcode image.

The **no microcode** command cancels any existing instructions to load an image from a Flash memory card and restores the default configuration:

```

Router(config)# no microcode ecpa slot0:xcpa28-1

```

Step 4 To save the configuration file, press **Ctrl-Z** (or type **end**), then copy the new configuration to NVRAM:

```

Router# copy running-config startup-config

```

- Step 5 To verify that the correct microcode is loaded according to the new instructions, enter the **show controllers EXEC** command. The display indicates the currently loaded and running microcode version for each HP ESCON PA.
- Step 6 To verify the contents of the configuration file, enter the **show running-config EXEC** command. You can also verify that the correct software image is configured to load at system restart or reload by using the **show startup-config EXEC** command.

Using Flash Memory

The following provides information on the different functions of Flash memory that you might need when configuring microcode:

- [Copying a New Image to the Flash Memory Card on a Cisco 7200 Series Router, page 36](#)
- [Using Additional Flash Memory Commands, page 37](#)
- [Recovering from Locked Blocks, page 38](#)

Copying a New Image to the Flash Memory Card on a Cisco 7200 Series Router

Copying a new image to a Flash memory card might be required when a new microcode image becomes available. Use the command **copy tftp:filename [bootflash | slot0 | slot1]:filename** for the copy procedure, where **tftp:filename** is the source of the file and **[bootflash | slot0 | slot1]:filename** is the destination in onboard Flash memory or on either of the Flash memory cards.

The following example shows the output from the **copy tftp:filename** command for Cisco IOS Release 12.0:

```
Router# copy tftp:xcpa28-6 slot0:xcpa28-6
Address or name of remote host [181.23.250.2]?

Accessing tftp://181.23.250.2/jdoe/xcpa218-6...
Loading jdoe/xcpa218-6 from 181.23.250.2(via Ethernet3/0):!
Expanding slot0:/xcpa218-6_kernel_ecpa4 (472086 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_kernel_xcpa (414940 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_802 (246184 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_cmpc (562804 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_csna (96488 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_eca (460712 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

Expanding slot0:/xcpa218-6_seg_offload (91976 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_pca (68844 bytes):!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_push (15492 bytes):!!!
Expanding slot0:/xcpa218-6_seg_sslc (827760 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_tcpip (161196 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Expanding slot0:/xcpa218-6_seg_tn3270 (680672 bytes):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!

[OK - 4109312/8218624 bytes]
```

```
4109312 bytes copied in 206.344 secs (19948 bytes/sec)
```

**Note**

In the preceding example, the exclamation points (!) appear as the file is downloaded, and the “c” characters signify calculation of the checksum, which is a verification that the file has been correctly downloaded to the Flash memory card.

Using Additional Flash Memory Commands

There are additional commands related to the bootflash Flash memory in the Cisco 7200 series router (called *bootflash*) and in PCMCIA Flash memory cards. The following example assumes you are currently accessing the Flash memory card in PCMCIA slot 0. You can determine which PCMCIA slot you are accessing using the **pwd** command as follows:

```
Router# pwd
slot0
```

You can move between Flash memory media using the **cd [bootflash: | slot0: | slot1:]** command:

```
Router# cd slot0:
slot0
Router# cd slot1:
Router# pwd
slot1
```

You can list the directory of any Flash memory media using the **dir [bootflash: | slot0: | slot1:]** command:

```
Router# dir
-#- -length- -----date/time----- name
1  4601977  May 19 2000 09:42:19 myfile1
6   679     May 19 2000 05:43:56 todays-config
7   1       May 19 2000 09:54:53 fun1
```

You can delete a file from any Flash memory media using the **delete** command:

```
Router# delete slot0:fun1
Router# dir
-#- -length- -----date/time----- name
1  4601977  May 19 2000 09:42:19 myfile1
6   679     May 19 2000 05:43:56 todays-config
```

To verify that the **delete** command was successful, use the **dir /deleted** command to view the deleted files.

**Note**

Files that are deleted are simply marked as deleted, but still occupy space in Flash memory. To remove the files, use the **squeeze** command.

You can permanently remove files, which are marked as deleted, and push together all other undeleted files to eliminate spaces between them using the **squeeze** command:

```
Router# squeeze slot0:
All deleted files will be removed, proceed? [confirm]
Squeeze operation may take a while, proceed? [confirm]
ebESZ
```

To prevent loss of data because of sudden power loss, the “squeezed” data is temporarily saved to a special location of Flash memory.

In the **squeeze** command display output, the displayed characters have the following meaning:

- The character “e” means the Flash memory special location has been erased, which occurs before a write operation.
- The character “b” means that the data that is about to be written to this special location has been temporarily copied.
- The character “E” signifies that the sector that was temporarily occupied by the data has been erased.
- The character “S” signifies that the data was written to its permanent location in Flash memory.
- The character “Z” means this log was erased after the successful **squeeze** command operation.

The **squeeze** command automatically tracks which of these functions has been performed so upon sudden power failure, it can safely continue with the process.

Recovering from Locked Blocks

A locked block of Flash memory occurs when power is lost or a Flash memory card is unplugged during a write or erase operation. When a block of Flash memory is locked, it cannot be written to or erased, and the operation will consistently fail at a particular block location. The only way to recover from locked blocks is by reformatting the Flash memory card with the **format** command.



Caution

Formatting a Flash memory card to recover from locked blocks will cause existing data to be lost.

Using SanDisk Devices

PCMCIA Flash memory cards use a slot0/slot1 convention to specify memory locations; slot0 is the default directory for IOS searches. However, SanDisk memory devices use a disk0/disk1 convention. Therefore, when you use a SanDisk device on a Cisco 7200 series router, you need to specify disk0 or disk1 explicitly in IOS search arguments.

For example, to copy a new microcode image to a Sandisk device, use the following command:

```
copy tftp:source_filename {disk0 | disk1}:sandisk_filename
```

where:

- *source_filename* is the source location of the microcode image file
- *sandisk_filename* is the destination on disk0 or disk1 of the SanDisk memory card

The following example shows sample output for the **copy tftp:filename** command:

```
Router# copy tftp:xcpa27-1 disk0:xcpa27-1
2283972 bytes available on device flash, proceed? [confirm]
Address or name of remote host [biff.cisco.com]? [confirm]
Source filename [xcpa27-1]? [confirm]
Destination filename [xcpa27-1]? [confirm]
Accessing file "xcpa27-1" on biff.cisco.com ...
Loading xcpa26-1 from 1.1.1.22 (via FastEthernet0/0):!
  Expanding disk0:xcpa27-1_kernel_xcpa (406910 bytes):!!!!!!!!!!!!
  Expanding disk0:xcpa27-1_seg_802 (245522 bytes):!!!!!!!!!!!!
  Expanding disk0:xcpa27-1_seg_cmpc (564632 bytes):!!!!!!!!!!!!
  Expanding disk0:xcpa27-1_seg_csna (96024 bytes):!!!!!!!!!!!!
  Expanding disk0:xcpa27-1_seg_eca (460704 bytes):!!!!!!!!!!!!
  Expanding disk0:xcpa27-1_seg_offload (91420 bytes):!!!!!!!!!!!!
  Expanding disk0:xcpa27-1_seg_pca (68840 bytes):!!!!!!!!!!!!
```

```

Expanding disk0:xcpa27-1_seg_push (15488 bytes):!!!!!!!!!!!!
Expanding disk0:xcpa27-1_seg_tcpip (161140 bytes):!!!!!!!!!!!!
Expanding disk0:xcpa27-1_seg_tn3270 (620400 bytes):!!!!!!!!!!!!
[OK - 2739200/5478400 bytes]

```

2739200 bytes copied in 68.500 secs (40282 bytes/sec)

To update your running configuration:

Step 1 Enter the following commands, beginning in global configuration mode:

```

Router# configuration term
Router(config)# microcode ecpa diskX:xcpaXX-YY
Router(config)# microcode reload
Router(config)# end

```

where:

- *diskX* is **disk0** or **disk1** on the SanDisk device
- *xcpaXX-YY* is the xCPA image you want to use, such as **xcpa27-1**

Step 2 Save the running configuration to NVRAM.

Running HP ESCON PA Diagnostic Tests

The HP ESCON PA diagnostic test routines are as follows:

- Processor test 1
- Processor test 2
- I/O device tests
- Serial link controller (SLC) device tests
- Internal electrical wrap
- External optical wrap for the ESCON Channel Port Adapter



Note

All diagnostic tests are run every time the adapter is started. They cannot be run independently. The external optical wrap test requires special wrap plugs for the HP ESCON PA. Contact a service representative to obtain the appropriate wrap plugs

This document is to be used in conjunction with the documents listed in the [Preparing for Installation](#) section.

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